

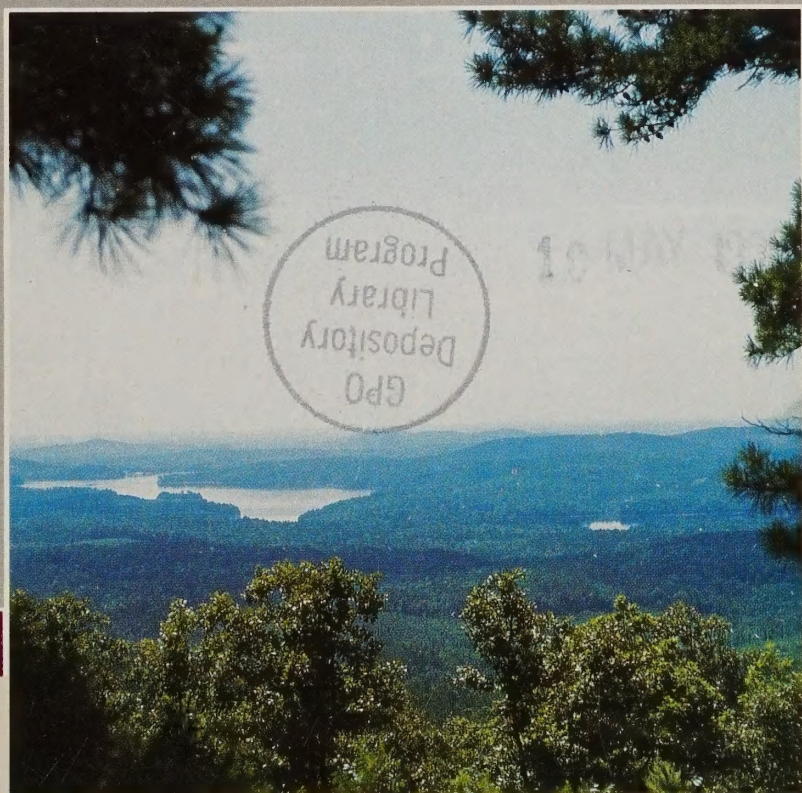
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Final Environmental Impact Statement

VEGETATION MANAGEMENT in the Ozark/Ouachita Mountains APPENDICES

VOLUME II



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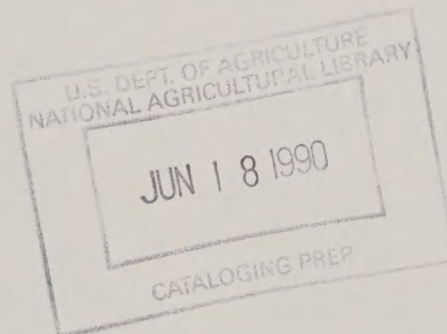
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Risk Assessment



APPENDIX A

FINAL RISK ASSESSMENT FOR THE USE OF HERBICIDES IN THE SOUTHERN REGION USDA FOREST SERVICE

Appendix A in the Draft EIS (the Risk Assessment for the Use of Herbicides in the Southern Region, USDA Forest Service) was not significantly changed based on public comment. It is not reproduced in full in this Final EIS.

Copies of appendix A in its entirety are filed in the Process Records and are available at any Forest Service Field Office of the Ozark and Ouachita National Forests.

Errata

On page 7-7 of appendix A, the formulae for LPM values for birds and mammals were accidentally reversed in the text. They should be as follows:

$$\text{Birds} \quad \text{LPM} = \frac{379 \times (\text{BWT}/1000)^{.80}}{1,000}$$

and

$$\text{Mammals} \quad \text{LPM} = \frac{284 \times (\text{BWT}/1000)^{.77}}{1,000}$$

Effects of Prescribed Fire on Soil and Water in Southern National Forests

APPENDIX B

APPENDIX B

EFFECTS OF PRESCRIBED FIRE ON SOIL AND WATER IN SOUTHERN NATIONAL FORESTS

BY

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Southern Region
Atlanta, GA 30367

December 1988

See Ozark/Ouachita Mountains Draft EIS

Effects of Herbicides on Soil Productivity and Water Quality

APPENDIX C

EFFECT OF HERBICIDES ON SOIL PRODUCTIVITY AND WATER QUALITY

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May 1988

See Ozark/Ouachita Mountains Draft EIS

**A Biological Evaluation
of the Effects of the
Preferred Alternative on
Threatened, Endangered,
Proposed, and
Sensitive Species**

APPENDIX D

A BIOLOGICAL EVALUATION OF THE EFFECTS OF THE FINAL PREFERRED ALTERNATIVE ON THREATENED, ENDANGERED PROPOSED, AND SENSITIVE SPECIES

By

James D. Fenwood
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Southern Region
Atlanta, GA 30367

January 1990

Summary

This biological evaluation addresses the effects of vegetation management activities described in the Final Environmental Impact Statement for Vegetation Management in the Ozark/Ouachita Mountains for the Southern Region of the U. S. Forest Service on threatened, endangered, proposed, and sensitive species. Effects of the program were determined to be beneficial or not detrimental. For threatened, endangered, and proposed species, concurrence from the USDI Fish and Wildlife Service is recommended. For sensitive species, informal coordination between affected national forests and appropriate State heritage agencies is recommended.

Introduction

Objectives:

The objectives of this biological evaluation are to:

1. Determine the effects of the program of vegetation management activities identified in the preferred alternative on threatened, endangered, and proposed plant and animal species occurring in national forests in the Ozark/Ouachita Mountains.
2. Determine the effects of the program of vegetation management activities identified in the preferred alternative on sensitive plant and animal species occurring in national forests in the Ozark/Ouachita Mountains.
3. Describe measures to be taken to mitigate potential adverse effects of activities described in the preferred alternative on threatened, endangered, or proposed species.
4. Describe measures to be taken to mitigate potential adverse effects of activities described in the preferred alternative on sensitive species.

This biological evaluation was prepared in accordance with Forest Service Manual 2671.44 and 2672.43 and regulations set forth in section 7(a) of the Endangered Species Act (ESA).

Ten animal species classified by the U. S. Fish and Wildlife Service as threatened or endangered (or proposed for listing as threatened or endangered) live in the Ozark and Ouachita National Forests. These species include two mammals, four birds, one reptile, two mollusks, and one land snail. There are no threatened or endangered plant species on either forest. Habitats of these species are managed under authority of the Endangered Species Act with the goal of population recovery.

In addition, certain species for which population viability is a concern are designated by the Regional Forester as "sensitive." Normally, this designation is established with the concurrence and guidance of the appropriate State Heritage Agency. Species listed in tables E-3 and E-4 include species so designated at the time this appendix was prepared and species being reviewed by the U. S. Fish and Wildlife Service for possible addition to the List of Endangered and Threatened Species under the Endangered Species Act of 1973, as amended, and describes their habitats. Habitats of sensitive species are managed to ensure population levels which will keep these plants and animals from becoming threatened or endangered.

Evaluation Methods

This evaluation was conducted from January 23–February 21, 1989, updated December 20–22, 1989, and is based upon:

1. Review of FSH 2609.23R–R8 AMEND. (The Wildlife Habitat Management Handbook) chapters 418, 420, 421, 422.
2. Review of recovery plans for the southern bald eagle, red-cockaded woodpecker, gray bat, Indiana bat, and American alligator.
3. Review of the scientific literature related to effects of vegetation management on listed species, including the following references:

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4. Review of relevant sections of the Federal Register.

5. Information presented in the EIS and appendices, including appendix A, the Risk Assessment for the Use of Herbicides in USDA Forest Service Southern Region.

6. Discussions with U. S. Forest Service biologists, botanists, and other specialists:

Mickey Beland
 Dennis Danner
 Danny Ebert
 Ron Escano
 Gary Hartman
 Larry Hedrick
 Jim Herrig
 Lauren Hillman
 Jimmy Huntley
 Ralph Odegard
 Levester Pendergrass
 Carl Racchini
 Ben Sanders

Cecil Thomas
Gary Tucker
Joan Walker

7. Discussions with other experts:

Regarding distribution and occurrence:

Sam Barkley, Arkansas Game and Fish Commission
Ken Smith, William Shepherd, Arkansas Nat. Heritage Comm.
John Harris, Arkansas State Highway and Transportation Department
Lance Peacock, Arkansas Nature Conservancy
V. R. McDaniel, S. E. Trauth, George Harp, Arkansas State University
William Caire, Central Oklahoma University
Mike Plummer, Harding University
James E. Gardner, Illinois State Natural History Survey
John Skeen, Oklahoma Department of Wildlife Conservation
Pat Cifelli, Oklahoma Natural Heritage Inventory
Renn Tumblison, Oklahoma State University
Henry Robison, Southern Arkansas University
Michael Harvey, Tennessee Tech University
John Pulliam, U. S. Fish and Wildlife Service
Douglas James, University of Arkansas at Fayetteville
G. A. Heidt, Charles Preston, Al Karlin, University of Arkansas, Little Rock
Sue Bozeman, Bill Puckett, Central Oklahoma Grotto, National Speleological Society
Robert Wilkinson, Southwest Missouri State University
Vernon Bates, Botanist, Atlanta, Georgia
Fred Burnside, EPA, Dallas, TX
Mike Kennedy, Memphis State University

Regarding treatment effects:

Bert Pittman, Arkansas Nat. Heritage Comm.
Paul Robertson, Bat Conservation International, Austin, TX
Ronald Eisler, USDI, Fish and Wildlife Service
Larry Landers, Tall Timbers Research Station
William McComb, Oregon State University
Phil Sczerzenie, LaBat-Anderson, Inc.
George Hurst, Mississippi State University
Cary Norquist, USDI, Fish and Wildlife Service
Melynda Reid, Volunteer, National Forests in Florida
Dennis Hardin, Florida Natural Areas Inventory
John Palis, Florida Natural Areas Inventory
Paul Hartfield, Mississippi Museum of Natural Science
Joseph Fitzpatrick, Jr. University of South Alabama
Latimore Smith, Louisiana Natural Heritage Program
Nelwyn Gilmore, Louisiana Natural Heritage Program

8. Informal consultation with John Pulliam, U. S. Fish and Wildlife Service, Jackson, Mississippi office, January 1989.

Much of this information was compiled and analyzed by David A. Saugey, Wildlife Biologist, USDA Forest Service.

Indications of adverse or beneficial effect shown in tables D-1, D-3, D-5, and D-6 and based on the best professional opinion of the individuals and sources cited in items 1-8 above. They are not necessarily the result of detailed scientific study and should not be construed as a substitute for site-specific analysis.

Affected Area and Proposed Actions

This evaluation examines the program of vegetation management described in the preferred alternative of the Final EIS. These activities are described in detail in chapter II of the EIS and fall into the broad categories of herbicides, prescribed fire, mechanical, manual, and biological (grazing) methods of managing vegetation. Treatments are employed to accomplish a variety of resource management goals including site preparation for stand establishment, timber and wildlife stand improvement, endangered species habitat management, and rights-of-way (ROW) maintenance. Effects of these treatments on plants and animals are discussed in detail in chapter IV of the EIS.

Proposed activities occur on the Ouachita and Ozark National Forests in two States located in the USDA Forest Service's Southern Region. This area is described in detail in chapter III of the EIS.

Potential Adverse Effects--General Mitigation Measures

As described in mitigation measures detailed in chapter II of the EIS, the following general requirements and measures apply to all vegetation management methods. Each forest may be more restrictive, but not less.

1. All projects will have site-specific analysis, in accordance with the National Environmental Policy Act (NEPA). This environmental analysis will consider site-specific techniques, intensity of application methods, and potential environmental effects of any method considered. A reasonable range of alternative methods, including the use of methods which do not involve herbicides, will be examined and evaluated.

Potential adverse effects on threatened, endangered, and sensitive species will be evaluated.

Requirements and measures for activities affecting threatened, endangered, or proposed species are detailed in species recovery plans and in FSH 2609.23R. Recovery plans have been prepared for the southern bald eagle, northern bald eagle, red-cockaded woodpecker, gray bat, Indiana bat, American alligator, and fat pocketbook pearly mussel. Chapters in FSH 2609.23R have been prepared for red-cockaded woodpecker, southern bald eagle, and American alligator.

Requirements and measures for activities affecting sensitive species are detailed in Forest Land and Resource Management Plans and amendments.

2. A biological evaluation of how a project may affect any species Federally listed as threatened, endangered, or proposed for listing, or identified by the Forest Service as sensitive, will be conducted as part of the site-specific environmental analysis process.

The site-specific biological evaluation considers all available inventories of threatened, endangered, proposed, and sensitive species populations for the proposed treatment area. When adequate population inventory information is unavailable, it will be collected when the affected site has high potential for occupancy by a threatened, endangered, proposed, or sensitive species. Table D-1 identifies the potential of adverse effects from vegetation management by species. When potential adverse effects are indicated, mitigation measures specified in chapter II of the EIS will be employed to prevent adverse effects.

If it is determined that the project may affect (including beneficial effects) Federally-listed endangered, threatened, or proposed species, consultation is initiated with the U. S. Fish and Wildlife Service. If, during informal consultation, it is determined that the project is not likely to adversely affect listed species and the U. S. Fish and Wildlife Service concurs in writing with that determination, consultation is terminated. However, if it is determined that the project is likely to adversely affect listed species, formal consultation is initiated. Figure D-1 outlines this process.

When the evaluation indicates that a project may have any adverse effect on a species or the habitat of a species listed as sensitive, appropriate State wildlife agencies, natural heritage commissions, and other cooperators or species authorities will be contacted to identify coordination measures. These measures will be directed towards ensuring species viability and preventing negative population trends that would result in Federal listing.

Potential Adverse Effects--Threatened, Endangered, and Proposed Animals

Table D-1 displays general information regarding potential effects of vegetation management methods on endangered, threatened, and proposed animals. The likelihood of adverse effect or significant risk of toxic effects is based on use of vegetation management without mitigation measures.

In most cases, properly applied prescribed fire is beneficial or has no effect on the listed species. However, unless proper techniques are employed, bald eagle nest trees and red-cockaded woodpecker cavity trees may be destroyed. Measures detailed in chapter II of the EIS concerning prescribed burn planning and execution and protection of threatened and endangered species habitat, mitigate this effect. Although effects of burning on the Indiana and gray bats are unknown, it is unlikely that prescribed burning would adversely affect these species since any effect of burning on aerial insect populations (the bats' main food source) in foraging areas would be minimal. Aquatic species are not affected.

Herbicides may be used to improve habitat for the red-cockaded woodpecker. Applied improperly, herbicides may cause the loss of bald eagle nest trees and red-cockaded woodpecker colony trees. These species are protected by restrictions regarding activities near their nesting sites. Habitat for aquatic species, such as the fat pocketbook pearly mussel, may be degraded if herbicides are used to reduce streamside vegetation. This risk is mitigated by Forest Land and Resource Management Plan standards and guides for protecting aquatic and riparian habitats. There is however, a potential for toxic effects on most threatened and endangered animals when certain herbicides are applied at extreme rates. Table D-2 displays the risk to terrestrial species from broadcast application at normal and extreme rates and to aquatic species from two accidental spill scenarios.

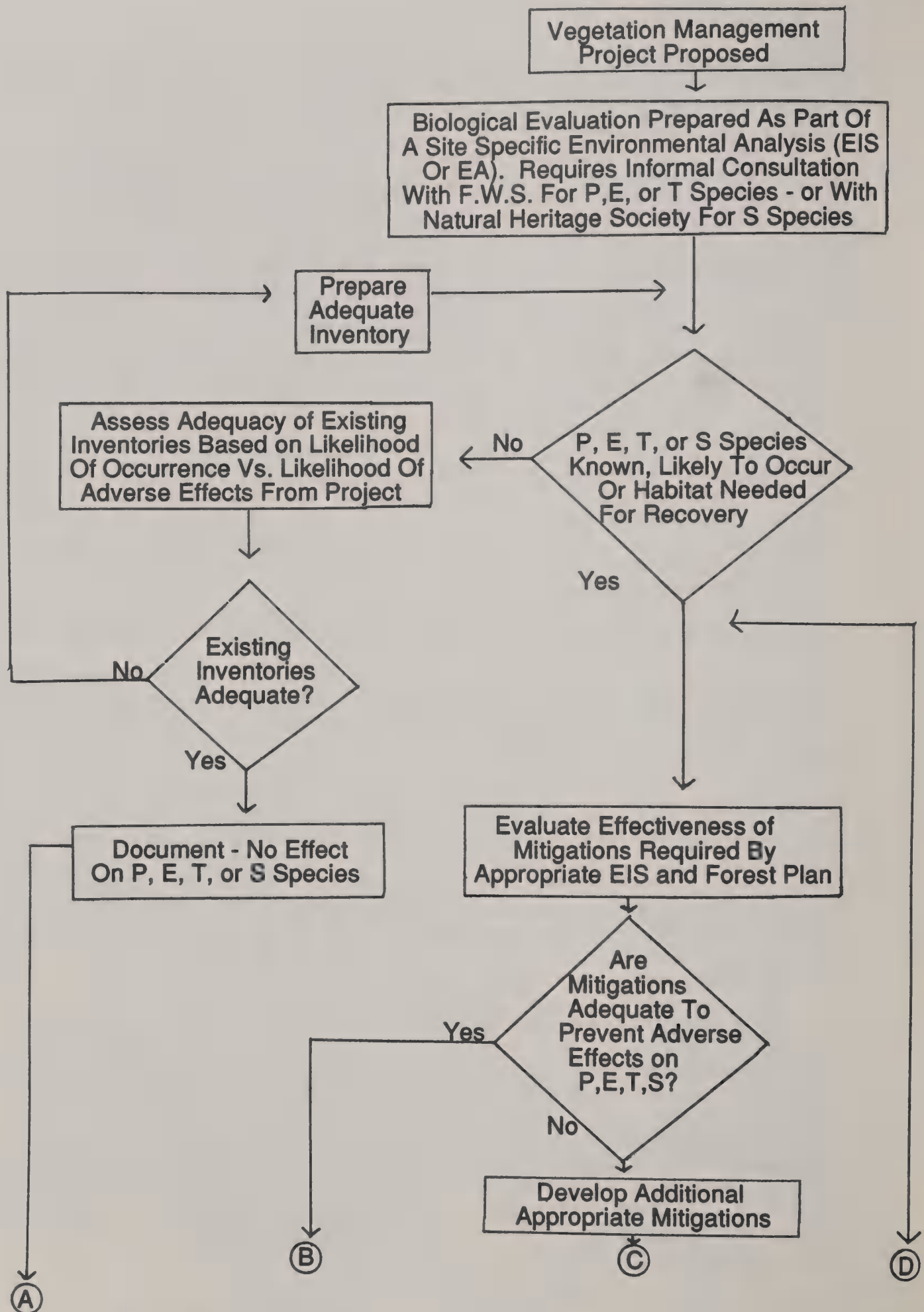
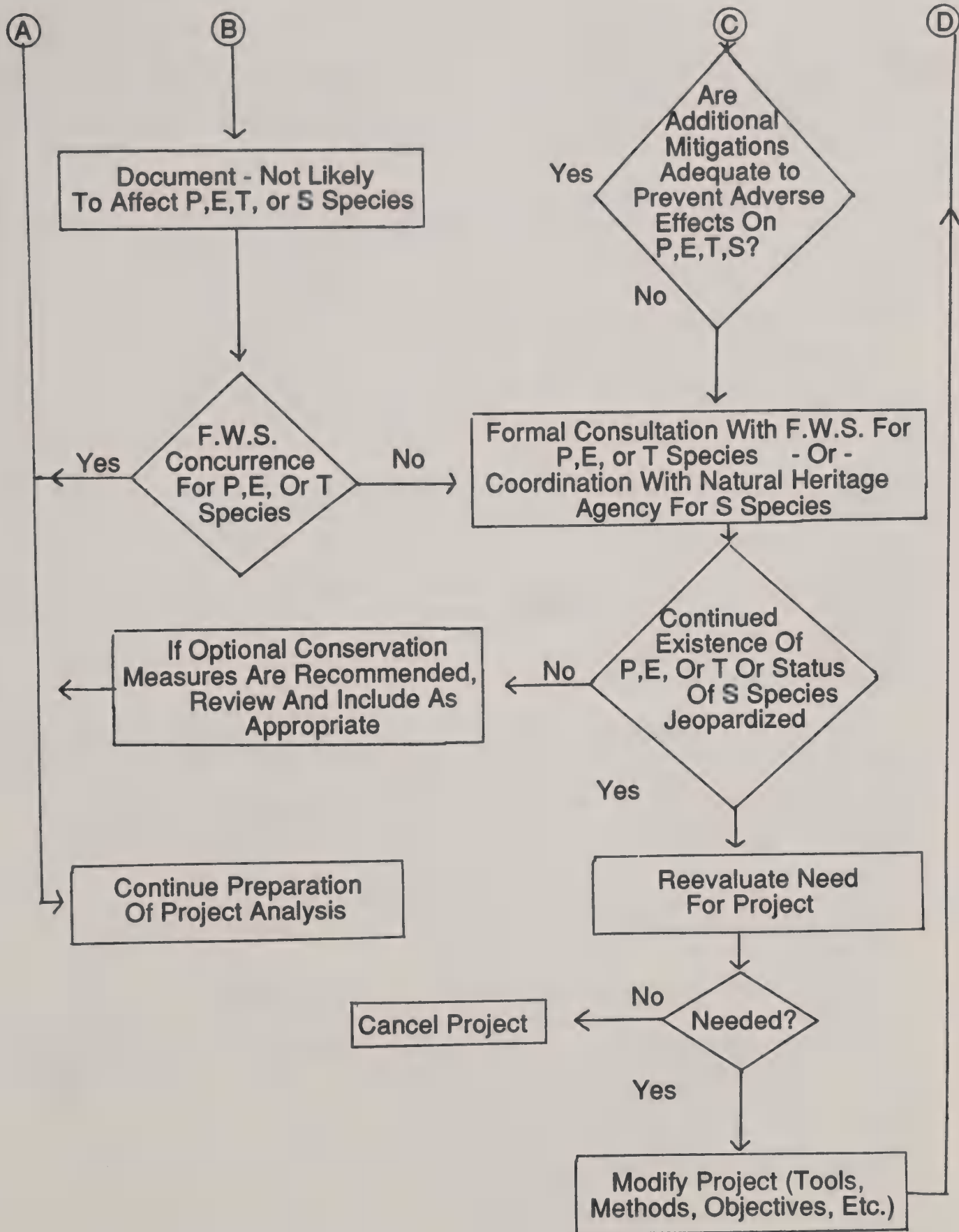


Figure D-1.--Site-specific environmental analysis process



At normal rates, a potential for significant risk (exposure greater than 1/10 LD₅₀) to gray and Indiana bats exists for triclopyr. Measures in chapter II of the EIS regarding selection and application of herbicides, and prohibition of application at extreme rates mitigates risk to animal species except for the gray and Indiana bats. Measures in chapter II restricting the application of triclopyr mitigates risk to these species.

There is a significant risk to the embryos of nesting threatened and endangered birds when kerosene, diesel oil, or any herbicide containing kerosene or diesel oil is broadcast applied during nesting season. A mitigation measure in chapter II prohibits such application.

Table D-2 also shows that two aquatic species, the fat pocketbook pearly mussel and the Arkansas fat mucket mussel, would be adversely affected (significant risk of exposure greater than 1/20 LC₅₀) if an accidental spill released sufficient amounts of certain herbicides into a water body they inhabit. Measures in chapter II of the EIS concerning handling, transportation, application, and spill clean-up mitigate this risk by making the likelihood of such exposure extremely low.

Manual treatments are beneficial when used to improve endangered species habitat. The American alligator, fat pocketbook pearly mussel, and Arkansas fat mucket mussel are unaffected since treatments do not occur in their habitat. Manual treatments are unlikely to alter aerial insect populations to the extent that gray or Indiana bats would be affected adversely. Other species are protected by Forest Land and Resource Management Plan standards and guides which protect wetlands and streamside zones. The bald eagle and red cockaded woodpecker are not affected as long as nest trees and colony sites are protected, and treatments are performed outside the nesting season.

Soil-disturbing mechanical treatments such as light or heavy disking and bedding may be used to improve the habitat of the red-cockaded woodpecker. They should not be used where the Magazine Mountain shagreen occurs. The American alligator, fat pocketbook pearly mussel, and Arkansas fat mucket mussel may be harmed if intensive soil-disturbing treatments result in increased siltation of their habitats. Measures in chapter II of the EIS regarding slope restrictions, distance to water bodies, and soil characteristics, reduce siltation and mitigate this risk. Adverse effects on other species are unlikely or do not occur. Non-soil-disturbing mechanical treatments such as mowing and chopping can improve habitat for the red-cockaded woodpecker.

Effects from biological methods generally do not occur since grazing is not conducted in the habitat of most of the listed species. Grazing may be used to improve habitat conditions for red-cockaded woodpecker. Heavy grazing near riparian areas could adversely affect the fat pocketbook pearly mussel and Arkansas fat mucket mussel. Measures in chapter II of the EIS designed to protect riparian areas from grazing, mitigate these effects.

Potential Adverse Effects--Threatened, Endangered, and Proposed Plants

There are no threatened, endangered, and proposed plants in the Ozark and Ouachita National Forests.

Determination of Effect--Threatened, Endangered, Proposed Species

The actions proposed in the preferred alternative are not likely to adversely affect any threatened, endangered, or proposed species. In accordance with FSM 2670, concurrence with this determination by the USDI Fish and Wildlife Service (FWS) is recommended. The EIS, this biological evaluation, and other appendices will be forwarded to the FWS for their use.

Potential Adverse Effects--Sensitive Animals and Plants

The same general mitigation measures designed to protect threatened, endangered, and proposed species, apply equally to sensitive species except that informal coordination with appropriate State heritage trust agencies takes the place of consultation with the FWS.

To protect Rafinesque's big-eared, small footed, and Southeastern Myotis bats, triclopyr is not applied aerially within 300 feet or by ground methods within 60 feet of any known populations.

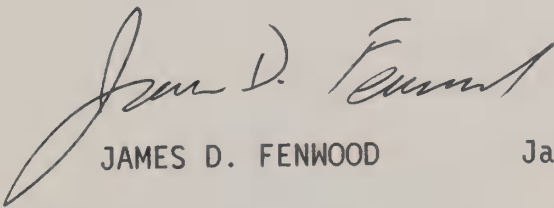
The eggs of all sensitive bird species are protected from broadcast application of kerosene, diesel oil, and herbicides containing kerosene and diesel oil by restrictions described in chapter II.

All plants listed as sensitive are protected by the same distance restrictions when applying any herbicide.

The effects of other treatments vary from beneficial to no effect to detrimental. These effects are considered in the site-specific environmental assessment and biological evaluation for each project.

Determination of Effect--Sensitive Species

The actions proposed in the preferred alternative are not likely to adversely affect any sensitive species. Informal coordination regarding this determination by appropriate State heritage trust agencies is recommended.



JAMES D. FENWOOD

January 1, 1990

Table D-1.—Potential effects of vegetation management (in the absence of mitigating measures) on animal species listed by the U. S. Fish and Wildlife Service as endangered, threatened, or proposed occurring in Ozark and Ouachita National Forests

Common Name	Prescribed Fire	Herbicide	Manual	Soil Disturbing Mechanical	Minimal Soil Disturbing Mechanical	Grazing
Bat, gray	U	U,T	U	U	U	U
Bat, Indiana	U	U,T	U	U	U	U
Bat, Ozark big-eared	U	U,T	U	U	U	U
Eagle, bald	A	A,T	A	A	N	N
Falcon, American peregrine	N	U,T	N	N	N	N
Falcon, Arctic peregrine	N	U,T	N	N	N	N
Woodpecker, red-cockaded	B	A, B,T	B	B	B	B
Alligator, American	N	U,T	U	A	N	A
Mussel, Arkansas fat mucket	N	U,T	N	A	A	A
Mussel, fat pocketbook pearly	N	U,T	N	A	A	A
Mussel, speckled pocketbook	N	U,T	N	A	A	A
Snail, Shagreen, Magazine Mountain	A/U	U	U	U	U	NA
Cavefish, Ozark	N	A,T	U	A	U	N

KEY

A = Adverse habitat effects
 B = Beneficial habitat effects if properly applied
 T = Significant risk of toxic effects
 N = No effect
 U = Unlikely
 N/A = Not applicable; does not occur

Table D-2.—Chemicals posing potential significant risk (in the absence of mitigation measures) to animal species listed by U. S. Fish and Wildlife Service as endangered, threatened, or proposed occurring in Ozark and Ouachita National Forests. Determination of risk based on risk calculated for most-closely related representative species from risk assessment (shown in parentheses)

Note: Information given within each block applies to all species listed within that block.

Common Name	Broadcast Herbicide (normal rate)	Broadcast Herbicide (extreme rate)	Accident (5-gal. spill)	Accident (100-gal.) spill
Falcon, American peregrine				
Falcon, arctic peregrine	DIE*, KER*	TRI DIE*, KER*	NA	NA
Eagle, bald				
(Kestrel, American)				
Woodpecker, red-cockaded	DIE*, KER*	TRI DIE*, KER*	NA	NA
(Woodpecker, Red-cockaded)				
Bat, gray				
Bat, Indiana	TRI	HEX, TRI	NA	NA
(Bat, red)				
Mussel, Arkansas fat mucket				
Mussel, fat pocketbook pearly	NA	NA	NA	NA
(Oyster, Virginia)				
Alligator, American	No	NA	NA	NA
(E. Box turtle)				
Shagreen (snail) Magazine Mtn.	NA	NA	NA	NA

*Eggs only

KEY

TRI = Triclopyr	HEX = Hexazinone	SUL = Sulfometuron	NO = No Risk
TRI(E) = Triclopyr ester	DIE = Diesel Oil	LIM = Limonene	NA = Not Applicable
GLY = Glyphosate	KER = Kerosene	MIN = Mineral Oil	
GLY(R) = Glyphosate (Roundup)			

Table D-3.--Chemicals posing potential significant risk (in the absence of mitigation measures) to animal species classified by Forest Service as sensitive occurring in Ozark and Ouachita National Forests. Determination of risk based on risk calculated for most-closely related representative species from risk assessment (shown in parentheses)

Note: Information given within each block applies to all species listed within that block.

Common Name	Broadcast Herbicide (normal rate)	Broadcast Herbicide (extreme rate)	Accident (5-gal. spill)	Accident (100-gal.) spill
Hawk, Red-shouldered	DIE*, KER*	TRI DIE*, KER*	NA	NA
<u>(Kestrel, American)</u>				
Sparrow, Bachman's	DIE*, KER*	DIE*, KER*	NA	NA
Sparrow, rufous-crowned				
<u>(Quail, Bobwhite)</u>				
Shrike, migrant loggerhead	DIE*, KER*	HEX, TEB, TRI DIE*, KER*	NA	NA
<u>(Bluebird, Eastern)</u>				
Salamander, Caddo Mountain				
Salamander, four-toed				
Salamander, Fourche Mountain				
Salamander, Rich Mountain	No	TRI	NA	NA
Salamander, Southern red-backed				
<u>(Toad, Woodhouse)</u>				
Turtle, Alligator Snapping	No	NA	NA	NA
<u>(Turtle, Eastern box)</u>				
Mussel, Western fan-shelled pearly	NA	NA	NA	NA
<u>(Oyster, Virginia)</u>				

*Eggs only

Table D-3.--Chemicals posing potential significant risk (in the absence of mitigation measures) to animal species classified by Forest Service as sensitive occurring on Ozark and Ouachita National Forests. Determination of risk based on risk calculated for most-closely related representative species from risk assessment (shown in parentheses) (continued)

Note: Information given within each block applies to all species listed within that block.

Common Name	Broadcast Herbicide (normal rate)	Broadcast Herbicide (extreme rate)	Accident (5-gal. spill)	Accident (100-gal.) spill
Bat, Rafinesque's big-eared				
Bat, small-footed	TRI	HEX, TRI	NA	NA
Bat, Southeastern Myotis (Bat, red)				
Madtom, Caddo Mountain	NA	NA	TRI(E), GLY(R), LIM, SUL	TRI(E), KER, DIE, GLY(R), SUL
Madtom, Ouachita				
(Hogsucker, northern)				
Darter, Arkansas				
Darter, crystal	NA	NA	DIE, KER, SUL, TRI(E)	DIE, KER, SUL, TRI(E)
Darter, longnose				
Darter, paleback				
Lamprey, least brook				
(Bass, small mouth)				
Shiner, Kiamichi	NA	NA	DIE, GLY, KER, LIM, SUL, TRI(E)	DIE, KER, SUL, TRI(E)
Shiner, Ouachita Mountain				
Shiner, peppered				
(Minnow, flathead)				

*Eggs only

Table D-3.—Chemicals posing potential significant risk (in the absence of mitigation measures) to animal species classified by Forest Service as sensitive occurring in Ozark and Ouachita National Forests. Determination of risk based on risk calculated for most-closely related representative species from risk assessment (shown in parentheses) (continued)

Note: Information given within each block applies to all species listed within that block.

Common Name	Broadcast Herbicide (normal rate)	Broadcast Herbicide (extreme rate)	Accident (5-gal. spill)	Accident (100-gal.) spill
Snail, Rich Mountain slitmouth				
Beetle, Magazine Mountain mold				
Amphipod, cave				
Amphipod, elevated spring				
Beetle, ground	NA	NA	NA	NA
Beetle, short-winged mold				
Bug, lace				
Butterfly, Diana fritillary				
Caddisfly				
Mayfly				
Snail, land				

KEY

TRI = Triclopyr	HEX = Hexazinone	SUL = Sulfometuron	NO = No Risk
TRI(E) = Triclopyr ester	DIE = Diesel Oil	LIM = Limonene	NA = Not Applicable
GLY = Glyphosate	KER = Kerosene	MIN = Mineral Oil	
GLY(R) = Glyphosate (Roundup)			

Table D-4.—Potential effects of vegetation management (in the absence of mitigating measures) on animal species classified by the Forest Service as sensitive, and by the U.S. Fish and Wildlife Service as candidate species being considered for possible listing as threatened, endangered or proposed, occurring in the Ouachita and Ozark National Forests

Common Name	Prescribed		Manual	Soil	Minimal	Grazing
	Fire	Herbicide		Disturbing Mechanical	Soil Disturbing Mechanical	
Amphipod, elevated spring	U	A,T,U	U	A	A	N/A
Amphipod, mountain cave	U	A,T,U	U	A	A	N/A
Bat, Rafinesque's big-eared	A,U	T,U	A	U	U	U
Bat, small-footed	A,U	T,U	A	U	U	U
Bat, Southeastern Myotis	A,U	T,U	A	U	U	U
Beetle, ground	A,U	A	■	A	A	■
Beetle, Magazine Mtn. mold	U	U	U	U	U	U
Beetle, short-winged mold	A,U	U	U	U	U	U
Butterfly, Diana fritillary	A,B	A,B	■	A	A	A
Caddisfly	■	U	U	U	U	U
Darter, Arkansas	■	A,T	U	A	A	A
Darter, crystal	N	A,T	U	A	A	A
Darter, longnose	N	A,T	U	A	A	A
Darter, paleback	A,U	A,T	U	A	A	A
Dragonfly, Ozark snake-tail	A,U	A,T	U	A	A	A
Hawk, red-shouldered	■	N,T	N	N	■	N
Bug, lace	A,U	U	U	U	U	U
Madtom, Caddo	■	A,T	U	A	A	A
Madtom, Ouachita	N	A,T	U	A	A	A
Mayfly	N	U	U	U	U	U
Mussel, Western fan-shelled pearly	N	T,U	N	A	A	A

Table D-4. Potential effects of vegetation management (in the absence of mitigating measures) on animal species classified by the Forest Service as sensitive, and by the U.S. Fish and Wildlife Service as candidate species being considered for possible listing as threatened, endangered or proposed, occurring in the Ouachita and Ozark National Forests (continued)

Common Name	Prescribed Fire	Herbicide	Manual	Soil Disturbing Mechanical	Minimal Soil Disturbing Mechanical	Grazing
Paddlefish	N	A,T	N	A	A	A
Salamander, Caddo Mtn	B	A,T	B,U	A,U	A,U	N
Salamander, four-toed	N	A,T,U	B,U	A,U	A,U	A
Salamander, Fourche Mtn.	B	A,T	B,U	A,U	A,U	U
Salamander, Rich Mtn.	B	A,T,U	B,U	A,U	A,U	U
Salamander, Southern red-backed	B	A,T	B	A	A	N
Shiner, Kiamichi	N	A,T	U	A	A	A
Shiner, Ouachita Mtn.	N	A,T	U	A	A	A
Shiner, peppered	N	A,T	U	A	A	A
Shrike, migrant loggerhead	B	B,T	B	B	B	B
Snail, land	A,U	A,U	A,U	U	U	N/A
Snail, Rich Mtn. slitmouth	A,U	A,U	U	U	U	N/A
Sparrow, Bachman's	B	A,T	B	A	A	N
Sparrow, rufous-crowned	A,U	A,T,U	A,U	A,U	A,U	N/A
Turtle, alligator snapping	N	T,U	U	B	N	B

A = Adverse habitat effects

B = Beneficial habitat effects if properly applied

T = Significant risk of toxic effects

N = No effect

U = Unlikely to occur

N/A = Not applicable; does not occur

Table D-5.—Potential effects of vegetation management (in the absence of mitigating measures) on plant species classified by the Forest Service as sensitive, and by the U.S. Fish and Wildlife Service as candidate species being considered for possible listing as threatened, endangered or proposed, occurring in the Ouachita and Ozark National Forests

Scientific Name	Prescribed Fire	Manual	Soil Disturbing Mechanical	Minimal Soil Disturbing Mechanical	Grazing
<u>Amorpha ouachitensis</u>	B	B	A	A	A
<u>Anemone quinquefolia</u>	A	B	A	A	A
<u>Bartonia paniculata</u>	A	A	A	A	A
<u>Calamogrostis insperata</u>	B	B	A	A	A
<u>Calamovilfa arcuata</u>	U	B	A	A	A
<u>Callirhoe papaver bushii</u>	B	■	A	B	A
<u>Cardamine angustata</u> var. <u>multifida</u>	A	B	A	A	A
<u>Carex bromoides</u>	A	A	A	A	A
<u>Carex communis</u>	A	A	A	A	A
<u>Carex laevivaginata</u>	A	A	A	A	A
<u>Carex latebracteata</u>	A	A	A	A	A
<u>Carex leptalea</u>	A	A	A	A	A
<u>Carex prasina</u>	A	A	A	A	A
<u>Carex pennsylvanica</u>	B	B	A	A	A
<u>Carex stricta</u>	A	A	A	A	A
<u>Carex virescens</u>	A	A	A	A	A
<u>Castanea pumila</u> var. <u>ozarkensis</u>	B	B	A	A	N
<u>Cirsium muticum</u>	A	A	A	A	A
<u>Cypripedium kentuckiense</u>	A	A	A	A	A
<u>Cypripedium reginae</u>	A	A	A	A	A
<u>Delphinium newtonianum</u>	A	B	A	A	A
<u>Delphinium trealeasei</u>	A/B	B	A	A	A
<u>Dennstaedtia punctilobula</u>	A	A	A	A	A

Table D-5.--Potential effects of vegetation management (in the absence of mitigating measures) on plant species classified by the Forest Service as sensitive, and by the U.S. Fish and Wildlife Service as candidate species being considered for possible listing as threatened, endangered or proposed, occurring in the Ouachita and Ozark National Forests (continued)

Scientific Name	Prescribed Fire	Manual	Soil Disturbing Mechanical	Minimal Soil Disturbing Mechanical	Grazing
<u>Disporum lanuginosum</u>	A	A	A	A	A
<u>Dodecatheon frenchii</u>	A	A	A	A	A
<u>Draba aprica</u>	B	B	B	B	B
<u>Dryopteris</u> x <u>australis</u>	A	A	A	A	A
<u>Dryopteris celsa</u>	A	A	A	A	A
<u>Dryopteris spinulosa</u>	A	A	A	A	A
<u>Echinacea paradoxa</u> var. <u>paradoxa</u>	B	B	A	B	A
<u>Eriocaulon kornickianum</u>	B	B	A	A	A
<u>Erysimum capitatum</u>	B	B	A	A	A
<u>Euonymus obovatus</u>	A	A	A	A	A
<u>Galium arkansanum</u> var. <u>publiflorum</u>	B	B	A	A	A
<u>Gentiana saponaria</u>	B	B	A	A	A
<u>Gratiola brevifolia</u>	A	B	A	A	A
<u>Hedyotis ouachitana</u>	B	B	A	A	A
<u>Heuchera parviflora</u> var. <u>puberula</u>	A	A	A	A	A
<u>Heuchera villosa</u> var. <u>arkansana</u>	A	A	A	A	A
<u>Hieracium scabrum</u>	A	B	A	A	A
<u>Hydrastis canadensis</u>	A	A	A	A	A
<u>Isotria verticillata</u>	B	B	A	A	A
<u>Leavenworthia aurea</u>	B	B	A	A	A
<u>Liatris squarrosa</u> var. <u>compacta</u>	B	B	A	A	A
<u>Lilium superbum</u>	A	B	A	A	A

Table D-5.—Potential effects of vegetation management (in the absence of mitigating measures) on plant species classified by the Forest Service as sensitive, and by the U.S. Fish and Wildlife Service as candidate species being considered for possible listing threatened, endangered or proposed, occurring in the Ouachita and Ozark National Forests (continued)

Scientific Name	Prescribed Fire	Manual	Soil Disturbing Mechanical	Minimal Soil Disturbing Mechanical	Grazing
<u>Liparis loeselii</u>	A	A	A	A	A
<u>Lycopodium lucidulum</u>	A	A	A	A	A
<u>Mimulus floribundus</u>	U	B	A	A	A
<u>Mitella diphylla</u>	A	A	A	A	A
<u>Neviusia alabamensis</u>	B	B	A	A	A
<u>Osmunda claytoniana</u>	A	A	A	A	A
<u>Parnassia grandifolia</u>	A	A	A	A	A
<u>Paronychia virginia</u> var. <u>scoparia</u>	B	B	A	A	A
<u>Penstemon cobaea</u> var. <u>purpureus</u>	B	B	A	A	A
<u>Phlox bifida</u> var. <u>stellaria</u>	B	B	A	A	A
<u>Polygala polygama</u>	B	B	A	A	A
<u>Quercus shumardii</u> var. <u>acerifolia</u>	B	B	A	A	N
<u>Rhynchospora capillacea</u>	A	B	A	A	A
<u>Ribes curvatum</u>	A	B	A	A	A
<u>Ribes cynosbati</u>	A	B	A	A	A
<u>Schisandra glabra</u>	A	A	A	A	A
<u>Sedum ternatum</u>	A	B	A	A	A
<u>Selaginella arenicola riddellii</u>	B	B	A	A	A
<u>Silene ovata</u>	A	A	A	A	A
<u>Sium suave</u>	A	A	A	A	A
<u>Spiranthes lucida</u>	A	A	A	A	A
<u>Stachys eplingii</u>	A	A	A	A	A

Table D-5.—Potential effects of vegetation management (in the absence of mitigating measures) on plant species classified by the Forest Service as sensitive, and by the U.S. Fish and Wildlife Service as candidate species being considered for possible listing as threatened, endangered or proposed, occurring in the Ouachita and Ozark National Forests (continued)

Scientific Name	Prescribed Fire	Manual	Soil Disturbing Mechanical	Minimal Soil Disturbing Mechanical	Grazing
<u>Stenanthium gramineum</u>	A	A	A	A	A
<u>Streptanthus obtusifolius</u>	B	B	A	B	A
<u>Streptanthus squamiformis</u>	B	B	A	B	A
<u>Thelypteris noveboracensis</u>	A	A	A	A	A
<u>Tradescantia ozarkana</u>	A	A	A	A	A
<u>Trichomanes boschianum</u>	A	A	A	A	A
<u>Trichomanes petersii</u>	A	A	A	A	A
<u>Trillium flexipes</u>	A	A	A	A	A
<u>Trillium pusillum</u> var. <u>ozarkanum</u>	A	A	A	A	A
<u>Uvularia perfoliata</u>	A	B	A	A	A
<u>Veratrum woodii</u>	A	A	A	A	A
<u>Waldsteinia fragarioides</u>	A	B	A	A	A
<u>Woodsia scopulina</u> var. <u>appalachiana</u>	A	A	A	A	A

KEY

A = Adverse habitat effects

B = Beneficial habitat effects if properly applied

M = No effect

Lists of Threatened, Endangered, Proposed, and Sensitive Animal and Plant Species of the Ozark/Ouachita Mountains

APPENDIX E

LISTS OF THREATENED, ENDANGERED, PROPOSED, AND SENSITIVE ANIMAL AND PLANT SPECIES OF THE OZARK/OUACHITA MOUNTAINS

BY

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Table E-1.—Animal species listed by the U.S. Fish and Wildlife Service as endangered, threatened, or proposed, that occur or may occur in the Ouachita and Ozark National Forests

COMMON NAME	SCIENTIFIC NAME	STATUS	STATES CLASSIFIED T,E,P	HABITAT
Alligator, American	<u>Alligator mississippiensis</u>	T ³	AR/OK	Swamps, lakes, marshy areas.
Bat, gray	<u>Myotis grisescens</u>	E	AR	Caves, especially near large streams and nearby forests.
Bat, Indiana	<u>Myotis sodalis</u>	E	AR/OK	Caves and adjoining forests.
Bat, Ozark big-eared	<u>Plecotus townsendii ingens</u>	E ⁴	AR	Caves and adjoining forests.
Cougar, eastern	<u>Felis concolor couguar</u>	E ²	AR	Habitat mosaic of different forest types and successional stages.
Cavefish, Ozark	<u>Amblyopsis rosae</u>	T ⁴	AR	Cave streams and pools.
Darter, leopard	<u>Percina pantherina</u>	T ²	AR	Gravel and cobble-bottomed riffles and raceways of larger creeks and small rivers with high gradients.
Eagle, Bald	<u>Haliaeetus leucocephalus</u>	E	AR/OK	Wintering. Large impoundments, rivers.
Falcon, American peregrine	<u>Falco peregrinus anatum</u>	E	AR/OK	Rare, winter migrant.
Falcon, Arctic peregrine	<u>Falco peregrinus tundruis</u>	T	AR/OK	Rare, winter migrant.
Mussel, Arkansas fat mucket	<u>Lampsilis powelli</u>	PT	AR	Clear, silt free, high gradient streams.
Mussel, fat pocketbook pearly	<u>Potamilus (=Proptera) capax</u>	E	AR	Large rivers and tributaries. Substrate contains a mixture of sand, mud, and clay.
Mussel, speckled pocketbook	<u>Lampsilis streckeri</u>	E ⁴	AR	Streams with substrate of coarse to muddy sand.
Panther, Florida	<u>Felis concolor coryi</u>	E ²	AR	Habitat mosaic of different forest types and successional stages.
(Snail) Shagreen, Magazine Mountain	<u>Mesodon magazinensis</u>	T	AR	Cool moist crevices within rock slides on the north slope of Magazine mountain.

Table 1-1.—Animal species listed by the U.S. Fish and Wildlife Service as endangered, threatened, or proposed, that occur or may occur in the Ouachita and Ozark National Forests (continued)

COMMON NAME	SCIENTIFIC NAME	STATUS	STATES CLASSIFIED	HABITAT
			T.E.P	
Warbler, Bachman's	<i>Vermivora bachmannii</i>	E ¹		
Woodpecker, hairy-billed	<i>Campephilus principalis</i>	E ¹		
Woodpecker, red-necked	<i>Picoides borealis</i>	E	AR/OK	Open mature stands of short-leaf pine.

¹ No verifiable sightings on national forest lands in recent history.

² Occurrence questionable. Cooperative study between the Arkansas Game and Fish Commission, USDI Fish and Wildlife Service, and the Ouachita and Ozark National Forests, entitled, "Field Investigation of the Florida Leopard in Arkansas Through Radio Telemetry," should resolve the question of occurrence and distribution of the leopard darter in Arkansas. The leopard darter occurs within the proclaimed boundary of the Ouachita N.F., but has been found only in streams in private ownership. Two intensive studies of upland streams on N.F. have either indicated the habitat unsuitable and/or the fish was not found.

³ Threatened due to similarity of appearance.

⁴ Has never been documented on forest, but may be present.

Table E-2.—Plant species listed by the U.S. Fish and Wildlife Service as endangered, threatened, or proposed, that occur or may occur in the Ouachita and Ozark National Forests

COMMON NAME	SCIENTIFIC NAME	STATUS	STATES CLASSIFIED	HABITAT
			T,E,P	
Geocarpon	<u>Geocarpon minimum</u>	T ¹	AR	Sandstone glades and barren area on high-sodium and magnesium soils.

¹ Has never been documented on forest, but may be present.

Table E-3.--Animal species listed as sensitive by the U.S. Forest Service, and species being considered for possible listing as threatened, endangered, or proposed by the U.S. Fish and Wildlife Service, that occur or may occur in the Ouachita and Ozark National Forests

COMMON NAME	SCIENTIFIC NAME	STATES CLASSIFIED CANDIDATE/SENSITIVE	HABITAT
Amphipod, elevated spring	<u>Stygobromus elatus</u>	AR	Springs on slope of Magazine Mountain.
Amphipod, mountain cave	<u>Stygobromus montanus</u>	AR/OK	Springs on top of Rich Mountain
Bat, Rafinesque's big-eared	<u>Plecotus rafinesquii</u>	AR/OK	Caves, forested areas, hollow trees.
Bat, small-footed	<u>Myotis leibii</u>	AR/OK	Caves in winter, forested areas.
Bat, Southeastern Myotis	<u>Myotis austroriparius</u>	AR	Abandoned mines, caves, hollow trees, forested areas near water.
Beetle, ground	<u>Scaphinotus parvasiana</u>	AR	Beneath logs and leaf litter in mature hardwood forests.
Beetle, Magazine Mtn. mold	<u>Arianops sandersoni</u>	AR	Damp debris at base of bluffs on Magazine Mountain.
Beetle, short-winged mold	<u>Quachitychus parvaculus</u>	AR	Under leaf litter and rocks on Magazine Mtn.
Caddisfly	<u>Paucicalcaria ozarkensis</u>	AR	Gutter Rock creek on Magazine Mtn.
Butterfly, Diana fritillary	<u>Speyeria diana</u>	AR	Open areas in hardwood forests.
Cavefish, Southern ¹	<u>Typhlichthys subterraneus</u>	AR	Cave streams and pools.
Darter, Arkansas ¹	<u>Etheostoma cragini</u>	AR	In association with aquatic vegetation in small permanent-flow springs and spring-fed creeks.
Darter, crystal	<u>Ammocrypta asprella</u>	OK	Riffle areas in moderate to large rivers, over sandy bottoms.

Table E-3.—Animal species listed as sensitive by the U.S. Forest Service, and species being considered for possible listing as threatened, endangered, or proposed by the U.S. Fish and Wildlife Service, occurring in the Ouachita and Ozark National Forests (continued)

COMMON NAME	SCIENTIFIC NAME	STATES CLASSIFIED CANDIDATE/SENSITIVE	HABITAT
Darter, least ¹	<u>Etheostoma microperca</u>	AR	Gravel bottoms of small clear springs and creeks.
Darter, longnose	<u>Percina nasuta</u>	AR	Clear, silt-free upland streams.
Darter, paleback	<u>Etheostoma pallididorsum</u>	AR	Slack-water areas along edges of clear, spring-fed gravel bottomed streams.
Darter, stargazing ¹	<u>Percina uranidea</u>	AR	Swift current in deep riffles of moderate sized rivers.
Darter, yellowcheek ¹	<u>Etheostoma moorei</u>	AR	High gradient headwater drainages of Little Red River.
Dragonfly, Ozark snake-tail	<u>Ophiogomphus westfalli</u>	AR	Riparian areas of small to large streams.
Hawk, red-shouldered	<u>Buteo lineatus</u>	AR/OK	Forested areas, particularly mature bottomland forests.
Hellbender ¹	<u>Cryptobranchus alleganiensis</u>	AR	Larger streams and rivers with adequate rock and other debris.
Lacebug	<u>Acalypta susana</u>	AR	Leaf litter and mossy areas in hardwoods on Rich and Magazine Mtns.
Lamprey, least brook	<u>Lampetra aepyptera</u>	AR	Headwater streams with clean gravel riffles.
Lizard, Texas horned ¹	<u>Phrynosoma cornutum</u>	AR	Open, dry areas with sandy soil or abundant rocks.
Madtom, Caddo	<u>Noturus taylori</u>	AR	Clear, shallow, water flowing over small rocks or gravel producing shoals near shore.

Table E-3.—Animal species listed as sensitive by the U.S. Forest Service, and species being considered for possible listing as threatened, endangered, or proposed by the U.S. Fish and Wildlife Service, occurring in the Ouachita and Ozark National Forests (continued)

COMMON NAME	SCIENTIFIC NAME	STATES	HABITAT
		CLASSIFIED CANDIDATE/SENSITIVE	
Madtom, Ouachita	<u>Noturus lachneri</u>	AR	Backwater areas with cobblestone-sized rocks, to small gravel, to soft substrates in clear, high-gradient streams.
Mayfly	<u>Paraleptophlebia calcarica</u>	AR	Gutter Rock creek on Magazine Mtn.
Mussel, Neosho mucket ¹	<u>Lampsilis rafinesqueana</u>	AR	Clear, silt free, high-gradient streams.
Mussel, Western fan-shelled pearly	<u>Cyprogenia aberti</u>	AR	Clear, silt-free, high-gradient streams.
Paddlefish	<u>Polydon spathula</u>	AR	Large, low-gradient, river systems and their tributaries.
Salamander, Caddo Mtn.	<u>Plethodon caddoensis</u>	AR	Moist hardwood, mixed forests on north facing slopes, under logs and rocks, of the Novaculite Uplift area.
Salamander, four-toed	<u>Nemidactylum scutatum</u>	AR/OK	In moss, under logs and rocks adjacent to springs and seeps.
Salamander, Fourche Mtn.	<u>Plethodon fourchensis</u>	AR	Moist mixed forests on north facing slopes under logs and rocks.
Salamander, Oklahoma ¹	<u>Eurycea tynerensis</u>	AR	Cool, clear creeks and springs with large amounts of gravel for substrate.
Salamander, King Mtn.	<u>Plethodon ouachitae</u>	AR/OK	Moist, hardwood and mixed forests on north slopes under sandstone rubble, logs and occasionally in caves.
Salamander, Southern four-toed	<u>Plethodon serratus</u>	AR/OK	Under rocks, logs in riparian areas and on mesic north slopes.

Table E-3.—Animal species listed as sensitive by the U.S. Forest Service, and species being considered for possible listing as threatened, endangered, or proposed by the U.S. Fish and Wildlife Service, that occur or may occur in the Ouachita and Ozark National Forests (continued)

COMMON NAME	SCIENTIFIC NAME	STATES	HABITAT
		CLASSIFIED CANDIDATE/SENSITIVE	
Shiner, Kiamichi	<u>Notropis ortenburgeri</u>	AR/OK	Pools over gravel, rubble, or boulder-strewn substrates in small to moderate sized, clear upland streams.
Shiner, Ouachita Mtn.	<u>Notropis snelsoni</u>	AR	Pool regions of clear, high-gradient medium to large sized streams.
Shiner, peppered	<u>Notropis perpallidus</u>	AR/OK	Pools at the upper end of riffles in larger streams and in head-water areas.
Shrike, migrant loggerhead	<u>Lanius ludovicianus migrans</u>	AR/OK	Grass/forb condition, early seral stage habitat conditions.
Snail, land	<u>Paravitrea aulacogyra</u>	AR	Talus at cliff base on Magazine Mtn.
Snail, Rich Mtn. slitmouth	<u>Stenotrema pilsbryi</u>	AR/OK	Rock slides on the north slopes of Blackfork and Rich Mts.
Sparrow, Bachman's	<u>Aimophila aestivalis</u>	AR/OK	Mature pine and mixed forests with understory, young pine plantations.
Sparrow, rufous-crowned	<u>Aimophila ruficeps</u>	AR	Rocky, cliff-top shrubland on Magazine Mountain.
Sucker, blue ¹	<u>Cycleptus elongatus</u>	AR	Bottom of deep, fast-moving rivers and deep lakes.
Turtle, alligator snapping	<u>Macroclmys temmincki</u>	AR/OK	Deep sloughs, muddy pools of larger streams and rivers.

¹ Has never been documented on forest but may be present.

Table E-4.—Plant species listed as sensitive by the U.S. Forest Service, and species being considered for possible listing as threatened, endangered, or proposed by the U.S. Fish and Wildlife Service, that occur or may occur in the Ouachita and Ozark National Forests

COMMON NAME	SCIENTIFIC NAME	STATES CLASSIFIED CAND/SENSITIVE	HABITAT
Alumroot, Arkansas	<u>Heuchera villosa</u> var. <u>arkansana</u>	AR	Ledges of calcareous or sandy rock along upland streams and rivers.
Alumroot, little-leaved	<u>Heuchera parviflora</u> var. <u>puberula</u>	AR	Dryish north- or east-facing limestone bluffs.
Anemone, wood	<u>Anemone quinquefolia</u>	AR	Rocky moist open woods.
Bartonia, twining	<u>Bartonia paniculata</u>	AR/OK	Mesic to very wet low woodlands.
Beak-sedge, narrow-leaved	<u>Rhynchospora capillacea</u>	AR	Spring-fed calcareous meadows along streams, ledges and wet bluffs along streams.
Bedstraw	<u>Galium arkansanum</u> var. <u>publiflorum</u>	AR	Rocky open woodlands, thin soils, novaculite glades.
Bellwort, perfoliate	<u>Uvularia perfoliata</u>	AR	Fertile soils on woodland slopes.
Catch-fly, ovate-leaved	<u>Silene ovata</u>	AR	Rich, mesic woodlands.
Chinquapin, Ozark	<u>Castanea pumila</u> var. <u>ozarkensis</u>	AR/OK	Wooded rocky slopes and ridge tops.
Clubmoss, shining	<u>Lycopodium lucidulum</u>	AR	Lower talus slopes, narrow ravines, adjacent to streams.
Coneflower, yellow	<u>Echinacea paradoxa</u> var. <u>paradoxa</u>	AR	Glades, woodland openings.
Delphinium, Moore's	<u>Delphinium newtonianum</u>	AR	Moist, loamy clay soils in shade of upland hardwood forests.
Featherbells, Eastern	<u>Stenanthium gramineum</u>	AR	Woodland seeps.

Table E-4.—Plant species listed as sensitive by the U.S. Forest Service, and species being considered for possible listing as threatened, endangered, or proposed by the U.S. Fish and Wildlife Service, that occur or may occur in the Ouachita and Ozark National Forests (continued)

COMMON NAME	SCIENTIFIC NAME	STATES CLASSIFIED	
		CAND/SENSITIVE	HABITAT
Fern, Allegheny cliff-	<u>Woodsia scopulina</u> var. <u>appalachiana</u>	AR	Talus, ledges of sand-stone outcrops on north slope near summit of Mt. Magazine.
Fern, bristle-	<u>Trichomanes boschianum</u>	AR	Under shaded, overhanging sandstone outcrops.
Fern, dwarf filmy-	<u>Trichomanes petersii</u>	AR	Moist damp ledges in ravines and along streams.
Fern, hay-scented	<u>Dennstaedtia punctilobula</u>	AR	Crevices and ledges of moist, shaded sandstone outcrops.
Fern, interrupted	<u>Osmunda claytoniana</u>	AR	Near springs, seeps and cave entrances.
Fern, New York	<u>Thelypteris noveboracensis</u>	AR	Moist rocky soils of woods and thickets along seeps and streams.
Fern, small log-	<u>Dryopteris celsa</u>	AR	Moist to wet shaded areas around springs in rich woodlands.
Fern, small Southern wood	<u>Dryopteris</u> x <u>australis</u>	AR	Woodland seeps and moist rocky slopes.
Fern, spinulose shield-	<u>Dryopteris spinulosa</u>	AR	Moist, wooded slopes.
Gentian, soapwort	<u>Gentiana saponaria</u>	AR/OK	Areas of natural seepage, low woods.
Glade Cress, golden	<u>Leavenworthia aurea</u>	OK	Rocky glades and barren areas.
Goldenseal	<u>Hydrastis canadensis</u>	AR	Rich, moist, woodland slopes, ravines, floors of valley woods.
Gooseberry, granite	<u>Ribes curvatum</u>	AR	Rocky bluffs and slopes.
Gooseberry, prickly	<u>Ribes cynosbati</u>	AR/OK	North facing slopes and woodland ledges.

Table E-4.—Plant species listed as sensitive by the U.S. Forest Service, and species being considered for possible listing as threatened, endangered, or proposed by the U.S. Fish and Wildlife Service, that occur or may occur in the Ouachita and Ozark National Forests (continued)

COMMON NAME	SCIENTIFIC NAME	STATES CLASSIFIED CAND/SENSITIVE	HABITAT
Grass-of-Parnassus	<u>Parnassia grandifolia</u>	AR	Moist ledges along streams, bases of north facing slopes.
Hawkweed	<u>Hieracium scabrum</u>	AR	Rocky or dry open woods on north-facing slopes and blufflines.
Hedge-nettle, stachys	<u>Stachys eplingii</u>	AR	Moist to wet, mid-to-late successional woodlands.
Hellebore, Wood's false	<u>Veratrum woodii</u>	AR/OK	Mesic north slope hardwood/mixed forests.
Hedyotis, Ouachita	<u>Hedyotis ouachitana</u>	AR	Thin soils, steep bouldery slopes, areas of exposed novaculite.
Indigo, false	<u>Amorpha ouachitensis</u>	AR/OK	Riparian glades and moist upland glades.
Lady's slipper, showy	<u>Cypripedium reginae</u>	AR	Damp areas, wet woodlands, north-facing bluffs.
Lady's slipper, Southern yellow	<u>Cypripedium kentuckiense</u>	AR/OK	Mesic north slopes, floodplains, ravines, seepage areas.
Ladies' tresses, wide-leaved	<u>Spiranthes lucida</u>	AR	Base of moist limestone ledges, bluffs and spring-fed meadows bordering creeks.
Larkspur, Trelease's	<u>Delphinium treleasei</u>	AR	Limestone glades.
Liatris, scaly gay-feather	<u>Liatris squarrosa</u> var. <u>compacta</u>	AR	Rocky to sandy soils, dry open glades and woodlands.
Lily, Turk's cap	<u>Lilium superbum</u>	AR	Rich, moist woods.
Magnolia (Vine), climbing	<u>Schisandra glabra</u>	AR	Rich hardwood forests on loess soils.
Milkwort, purple (racemed)	<u>Polygala polygama</u>	OK	Open ground or open woods, ledges along streams.

Table E-4.--Plant species listed as sensitive by the U.S. Forest Service, and species being considered for possible listing as threatened, endangered, or proposed by the U.S. Fish and Wildlife Service, that occur on or may occur in the Ouachita and Ozark National Forests (continued)

COMMON NAME	SCIENTIFIC NAME	STATES	HABITAT
		CLASSIFIED CAND/SENSITIVE	
Miterwort	<u>Mitella diphylla</u>	AR	North facing wooded limestone or sandstone bluffs, humus covered talus.
Monkeyflower	<u>Mimulus floribundus</u>	AR	Damp areas on bluff faces, both open and shaded.
Moss, Riddell's spike-	<u>Selaginella arenicola riddellii</u>	AR	Thin soils, exposed novaculite.
Nail-wort, broom	<u>Paronychia virginia</u> var. <u>scoparia</u>	AR	Dry open woods, sandstone ledges and outcrops.
Oak, maple-leaf	<u>Quercus shumardii</u> var. <u>acerifolia</u>	AR	North slope of Mt. Magazine bluffline.
Pagonia, large whorled	<u>Isotria verticillata</u>	OK	Dry woodland slopes, ravines.
Penstemon, purple	<u>Penstemon cobaea</u> var. <u>purpureus</u>	AR	Limestone glades.
Phlox, sand	<u>Phlox bifida</u> var. <u>stellaria</u>	AR	Rocky slopes, sandy soils, bluffs, glades.
Pipewort, small-headed	<u>Eriocaulon kornickianum</u>	AR	Wet, acid sand in woodland openings, natural seeps, margins of upland pin oak swamps.
Poppy-mallow, Bush's	<u>Callirhoe papaver bushii</u>	AR	Rocky woods, glades, roadsides.
Reed grass, Cumberland	<u>Calamovilfa arcuata</u>	AR	Alluvial bars or banks of streams.
Reed grass, Ofer Hollow	<u>Calamogrostis insperata</u>	AR	Woodland ravines, open slopes, bluffs.
Sedge	<u>Carex bromoides</u>	AR	Low, wet woodlands, seeps.
Sedge	<u>Carex communis</u>	AR	Rich woods.

Table E-4.--Plant species listed as sensitive by the U.S. Forest Service, and species being considered for possible listing as threatened, endangered, or proposed by the U.S. Fish and Wildlife Service, that occur or may occur in the Ouachita and Ozark National Forests (continued)

COMMON NAME	SCIENTIFIC NAME	STATES CLASSIFIED CAND/SENSITIVE	HABITAT
Sedge, bristly-stalk	<u>Carex leptalea</u>	AR	Spring branches, base of moist shaded slopes.
Sedge, drooping	<u>Carex prasina</u>	AR	Seeps, pond borders, low, wet woodlands.
Sedge, Pennsylvania	<u>Carex pennsylvanica</u>	AR	Dryer acidic soils of upland wooded slopes.
Sedge, ribbed	<u>Carex virescens</u>	AR	Along springs, streams, wooded north slopes.
Sedge, smooth-sheathed	<u>Carex laevivaginata</u>	AR	Low wet woodlands, near streams, seeps.
Sedge, Waterfall's	<u>Carex latebracteata</u>	AR	Rocky, open-forested, hardwood slopes, ravines, bluffs.
Sedge, upright	<u>Carex stricta</u>	AR	Mesic to low wet woodlands.
Shooting-star, French's	<u>Dodecatheon frenchii</u>	AR	Under ledges and overhangs along deep ravines and protected areas.
Snow-wreath, Alabama	<u>Neviusia alabamensis</u>	AR	Woodlands, blufflines.
Spiderwort, Ozark	<u>Tradescantia ozarkana</u>	AR	Fertile rocky wood- ledges, ravines.
Sticky hedge-hyssop	<u>Gratiola brevifolia</u>	AR	Marshes, wet meadows, seeps, edges of ponds.
Strawberry, barren	<u>Waldsteinia fragarioides</u>	AR	Moist or dry forested areas, tops of bluffs.
Strawberry bush, running	<u>Euonymus obovatus</u>	AR	Rich, north-facing slopes and bluffs.
Thistle, swamp	<u>Cirsium muticum</u>	AR	Spring fed, swampy and seepage areas.
Toothwort, bittercrest	<u>Cardamine angustata</u> var. <u>multifida</u>	AR	Calcareous, mesic woodlands.

Table E-4.—Plant species listed as sensitive by the U.S. Forest Service, and species being considered for possible listing as threatened, endangered, or proposed by the U.S. Fish and Wildlife Service, that occur or may occur in the Ouachita and Ozark National Forests (continued)

COMMON NAME	SCIENTIFIC NAME	STATES CLASSIFIED CAND/SENSITIVE	HABITAT
Trillium, Ozark least	<u>Trillium pusillum</u> var. <u>ozarkanum</u>	AR	Humus on woodland ravine slopes, mesic north slopes.
Trillium, white	<u>Trillium flexipes</u>	AR	Mesic fertile slopes, woodland seeps.
Twayblade, yellow (Loesel's)	<u>Liparis loeselii</u>	AR	Woodland seeps, boggy areas, wet thickets.
Twistflower	<u>Streptanthus obtusifolius</u>	AR	Glades, dry sites, road cuts.
Twistflower, prairie	<u>Streptanthus squamiformis</u>	AR	Rocky hillsides, roadsides, disturbed woods.
Water-parsnip, hemlock	<u>Sium suave</u>	AR	Wet woodlands, along streams and springs.
Whitlow-grass, open-ground	<u>Draba aprica</u>	AR	Woodlands and opening, often under Eastern red cedar.
Wallflower, Western	<u>Erysimum capitatum</u>	AR	Limestone bluffs, glades, rocky ground, thin woods, rich woods with tight canopy.
Wood stonecrop	<u>Sedum ternatum</u>	AR	Damp low woods, wet bluffs, spring-fed areas.
Yellow mandarin	<u>Disporum lanuginosum</u>	AR	Rich, moist woods in deep ravines.

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